

## Trabajo Fin de Grado

Applying a Translation Brief: The Translation  
Process of *It's Time for an Urbanization Science*

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## Introduction

The aim of this dissertation is to demonstrate that the student has acquired the appropriate theoretical, analytical and methodological knowledge to produce successfully an academic essay in the field of the linguistic, literary or cultural studies in English (Grado en Estudios Ingleses 27841 – *Trabajo Fin de Grado*, 2013: 3) (my translation).

In this case, the dissertation falls within the linguistic field. Specifically, it is a hypothetical translation brief<sup>1</sup> of an article of 2000 words approximately, entitled *It's Time for an Urbanization Science*, published in the magazine *Environment: Science and Policy for Sustainable Development*, retrieved from: <http://www.environmentmagazine.org/Archives/Back%20Issues/2013/JanuaryFebruary%202013/urbanizationfull.html>

It is hypothetically going to be published by the Spanish magazine *Ecosistemas: Revista científica de ecología y medio ambiente* for a Spanish audience. The text deals with the theme of the urbanization process and its consequences. Therefore, it has been chosen because of the worldwide impact this topic has nowadays. Besides, it also has some interesting features that are worth exploring from the point of view of translation.

The source text is organised in three different parts: the main text, the notes and the author's institutional affiliation. According to this, it is important to take into account that this structure is going to be kept, although some changes need to be made in order to adjust it to the Spanish magazine.

One of the defining characteristics of science journalism is that, despite working with very detailed and technical data and information, science journalists have to make

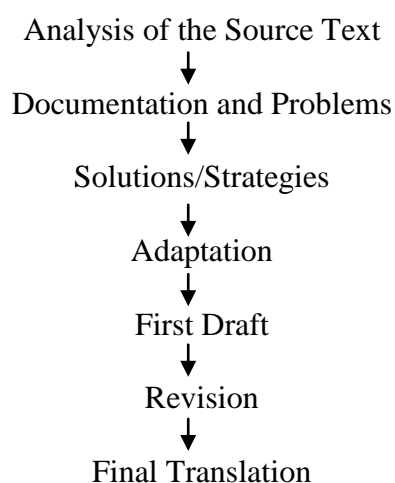
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<sup>1</sup> The translation brief is "a set of instructions prepared by a requester that accompanies a translation assignment, this enabling the requester to convey information about the source text, the specific communicative purpose and context in which the text is used, the intended uses of the translation and what it aims to accomplish." (Davydova, 2011)

the text reader-friendly, that is, attractive to ordinary consumers. To do that, they write short clear sentences and rhetorical questions in order to make the readers think. This will be fully explained in the analysis section, which explores all the important factors that need to be taken into account in the translation process.

The translation process follows Gouadec's (2007:16) stages that help to maintain the same purpose of the source text. It consists of three different parts: pre-transfer, transfer and post-transfer. Consequently, each part can be developed into different issues since they have a different methodology. Pre-transfer includes all the stages up to the actual translation, such as analysis, documentation, deciding terminology and the solution to any difficulty that can be presented. Transfer is the well-known activity of translating the text to another language. Post-transfer consists of what is done after the translation. It also includes the revision of the translation and the final preparations and delivery. This is the whole process that a translator should follow, therefore I should follow it without taking everything for granted.

According to this, instead of presenting a process applied to a real brief, such as the presented by Gouadec (2007: 16), it has been modified in order to adjust it to the hypothetical brief:



The process helps to the complete understanding of the target text. The final version of the translation is placed after the analysis.

At the end of the dissertation, there are two appendices: the source text as it appears on the webpage and the final version of the translation, which has followed the requirements of the online version of the Spanish magazine *Ecosistemas*, where it would be hypothetically released.

## **1. Textual Analysis**

According to Nord (2012), the importance and the functions that the pre-translational analysis of the source text has in the translational framework depend on the theoretical concept in which it is based. He also states that translation is related to the idea of equivalence, but it implies various needs at all levels of the text (Nord, 2012:34) (my translation):

- On the pragmatic level, it is required that the source and target text have the same function and are addressed to the same audience.
- The demand that the target text should reflect, copy and imitate the source text refers to the intratextual features about content and characteristics of both texts.
- The interpretation of equivalence as ‘identity of sense’, ‘equality of communicative values’ or ‘equality of the communicative effect’ implies that the target text should reproduce the interdependence between the intra- and extratextual factors that are presented in the source text.

If translation means equivalence, this analysis seems to be needed to get an equivalent in the Spanish version. The main function of the translator is to achieve the same intention with the same point of view, without changing anything, because a simple letter or a small change in the meaning of one expression can alter the whole text. Consequently, an extensive analysis has to be made in order to identify different inadequacies and to carry out the best possible translation.

### **1.1. Analysis of the Source Text**

The analysis of this text follows Nord’s (2012) stages. They include research of both intra- and extratextual factors. The former includes the summary of the text, all the linguistic devices and the register used in order to write the text and convey its meaning.

The later deals with information that surrounds the text but it is not presented explicitly in it, such as the information about the authors and the addressee, the time when it is produced and the place where it was written. Therefore, these are the different aspects on which this analysis is based.

### **Extratextual Factors:**

- **Authors of the Text:** There are three authors, so some research about their academic life was deemed necessary. The authors have worked for international projects, so they have a prestige and are experts in the field.
- **Addressee:** The addressee seems to be middle-aged people from developed countries with an average/high level of education.
- **Time and Place:** The date of the text is unknown, although it was published in January/February 2013 in Philadelphia, US. That is the reason why the text makes references to this country (6)<sup>2</sup> and the cities of New York and New Jersey (10).

### **Intratextual Factors:**

- **The Text:** The text to be translated has 1,943 words including the notes, and deals with the fact that both the urbanization process and everything that surrounds it is related to climate change and sustainability issues. The thesis statement is one of the most important parts of a text since it carries much information. In this case, it can also be the summary of the text, which is that “the science and policy communities increasingly recognize that cities, urban areas, and the underlying urbanization process are at the centre of global climate change and sustainability challenges” (2). The authors begin by introducing some data to catch the attention of the reader. After that, they use some facts and examples in order to support their thesis, emphasizing that much

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<sup>2</sup> These numbers refer to the paragraphs in Section 7 where the words taken from the text appears.

research has studied all this nowadays, but there is a gap in the study of the urbanization process which only contains much information but nothing useful for this field. At the end of the article, they explain why this science is needed now, supporting their view with facts previously mentioned. After the main text of the article, the notes about the text and about the author are written. However, they need a different process of translation and adaptation for the Spanish magazine, so this will be explained later.

- **Syntax of the Text:** Although it is a specialized topic, some questions are presented in order to open a dialogue with the reader such as “Why now?” (11). This stylistic device contributes to the real purpose of the text, which is to inform and raise awareness. On the one hand, this intention is obtained from the intra- and extratextual analysis in which the authors’ indignation is clear in the use of some words such as “panoply” (4) and “smorgasbord” (5). On the other hand, it is also obtained from the kind of information they deal with, which moves away from the general knowledge, so the author’s role is to inform people.

- **Register of the Text:** It is a semi-formal register because it deals with a specialized topic, which is made up of specialized terminology, but adapting it to reach a greater audience, so it can be said that the text goes through a process of popularization. An example of this would be the use of the “soccer fields” (5) as a measure instead of American football, implying that the text is addressed to an international audience.

## **1.2. Analysis of the Brief**

After a careful reading of some Spanish articles written in the *Ecosistemas* magazine, what can be said is that both magazines have similar conventions. As in the American magazine, the Spanish one deals with highly specialised topics but nonetheless it is



pleasant to read because of its popularization, that is, its adaptation to a general audience; there are many rhetorical questions and facts to support the authors' ideas.

- **Similarities and differences between both magazines:** Both magazines are very similar. Both have a heading followed by the name of the authors and the articles include subheadings. However, there is a difference: whereas the notes about the authors appear at the end of the American article, they appear after the name of the authors in the Spanish version. With respect to the references, the Spanish article has bibliography instead of notes, so this has to be adapted. Then, there are differences in the layout of both texts, but this is something that will be dealt with in the section about the adaptation.

## 2. Documentation

Following the translation process and after a first detailed reading and the analysis of the intra- and extratextual factors of the text, there could be some issues which the translator may find difficult to understand because of the cultural gap. In addition, the translator can have the same difficulty when dealing with the source text. As a result, it can be said that this is the main problem, because if they misinterpret something, this can change the complete meaning and purpose of the text. Then, what the translation process recommends is to make an effort of documentation in order to fill the gaps that there could be for the translator as well as the readers. In this case, there are different kinds of documentation.

### 2.1. Parallel Texts

This kind of texts helps the translator to be informed about the topics that surround the source text. In addition, the use of these texts helps the translator avoid any misunderstandings related to the information that appears in the text.

- **English texts:** There are many of them in the same magazine webpage of the source text. Some of them deal with the issue of urbanization in different cities and countries such as New York or China. Other examples of English texts related to the topic can be the article *The Science of Cities: Is Urbanization Sustainable?* written by Brian Hoffstein (2013), which deals with the fact that although cities are essential nowadays, it is necessary to know how to make them sustainable, or the article *The SymbioCity Approach: Conceptual Framework for Sustainable Urban Development in Low and Middle Income* (n.d.), which deals with the necessity of building strategies in order to make cities sustainable.

- **Spanish texts:** There is some information about the non-conciliation between cities and the sustainability or about whether inhabitants care about our world trying to

find possible solutions such as the articles *Urbanización y Sostenibilidad* (Vilches, Gil Pérez, Toscano & Macías, 2009) and *Sostenibilidad y racionalidad de los procesos de urbanización* (Fariña Tojo, 2002).

## **2.2. Specialized Texts**

They are a tool that the translator constantly uses because it provides him/her with the information that they may need. In this article, what the translator needs is a deeper knowledge of what “Rio+20” is since it is mentioned twice in the text and used as an argument in favour of the author’s proposal. In its official webpage, it is defined as:

“the short name for the United Nations Conference on Sustainable Development which took place in Rio de Janeiro, Brazil in June 2012 [...] The official discussions focused on two main themes: how to build a green economy to achieve sustainable development and lift people out of poverty; and how to improve international coordination for sustainable development.” (United Nations Department of Public Information, 2012)

## **2.3. Terminology**

The same happens with some terminology that goes beyond general cultural level. There is plenty of this terminology in the text but “gradient” (9) and “land change science” (11) are the words which presented some deeper research. In this context, “gradient” refers to the contrast between “the predominance of buildings and infrastructure, coupled with dense human population and sites having sparse infrastructure and low human population density” (Baltimore Ecosystem Study, 2012). The expression “land change science” refers to how “natural landscapes have routinely been converted to human-dominated areas for cultivation, occupation, and other economic activity” (U.S. Department of the Interior, 2013).

## **2.4. Spanish Equivalences**

What is interesting to explain is the case of “panoply” (4), translated as “panoplia” in Spanish; this word is related to the world of military. However, the meaning it really conveys in the text is the feeling of group, but with a bad connotation. After doing some

research in the corpus of contemporary Spanish (CREA), there are examples that take this particular case, such as “tomando como base una panoplia que incluía televisores, vídeos, vajillas”.

## 2.5. Documentation Sheet

The documentation sheet includes the reference list which I have used in the translation process.

| Información para buscar               | Referencias  |
|---------------------------------------|--|
| Artículos especializados              | <i>What is "Rio + 20"?</i> . (n.d.) Retrieved May 21, 2014, from the United Nations, The Future We Want webpage, <a href="http://www.un.org/en/sustainablefuture/about.shtml">http://www.un.org/en/sustainablefuture/about.shtml</a>   |
| Textos paralelos en inglés            | Hoffstein, B. (2013, October 13). <i>The science of cities: is urbanization sustainable?</i> Retrieved from <a href="http://bigthink.com/big-think-top-5/thescience-of-cities-is-urbanization-sustainable">http://bigthink.com/big-think-top-5/thescience-of-cities-is-urbanization-sustainable</a><br><br><i>The symbiocity approach: conceptual framework for sustainable urban development in low and middle income.</i> (n.d.) Retrieved April 20, 2014, from SLK International webpage, <a href="http://sklinternational.se/projects/project/the-symbio-city-approach-conceptual-framework-for-sustainableurban-development-in-low-and-middle-income-countries">http://sklinternational.se/projects/project/the-symbio-city-approach-conceptual-framework-for-sustainableurban-development-in-low-and-middle-income-countries</a> |
| Textos paralelos en español           | Vilches, A., Gil Pérez, D., Toscano, J.C. & Macías, O. (2009). <i>Urbanización y Sostenibilidad</i> . Retrieved from EOI. Retrieved from <a href="http://www.eoi.es/d ecada/a ccion20.htm">http://www.eoi.es/d ecada/a ccion20.htm</a><br><br>Fariña, J. (2002). <i>Sostenibilidad y racionalidad de los procesos de urbanización</i> . Retrieved April 20, 2014, from <a href="http://habitat.aq.upm.es/select-sost/acl.html">http://habitat.aq.upm.es/select-sost/acl.html</a>   |
| Terminología especializada            | <i>Urban rural gradient</i> . (2012, July 12) Retrieved May 10, 2014, from Baltimore Ecosystem Study, Lexicon webpage, <a href="http://besurbanlexicon.blogspot.com.es/2012/07/urban-rural-gradient.html">http://besurbanlexicon.blogspot.com.es/2012/07/urban-rural-gradient.html</a><br><br>U.S. Department of the Interior. (n.d.). <i>Land Change</i> . Retrieved April 10, 2014, from <a href="http://www.usgs.gov/climate_landuse/lcs/">http://www.usgs.gov/climate_landuse/lcs/</a>   |
| Diccionarios e información en español | Real Academia Española. <i>Corpus de referencia del español actual</i> . Retrieved from <a href="http://www.rae.es">http://www.rae.es</a><br><br>Real Academia Española. (2001). <i>Diccionario de la lengua española</i> (22.aed.). Retrieved from <a href="http://www.rae.es/rae.html">http://www.rae.es/rae.html</a><br><br>Real Academia Española y Asociación de Academias de la Lengua Española. (2005). <i>Diccionario panhispánico de dudas</i> . Madrid: Santillana.  |

### 3. Difficulties related to the translation of the text

Although there are Spanish rules about how to write, including orthotypographic features, it is extremely important to remember that the brief is made by a Spanish magazine, so all the features have to be adapted to this new communicative framework. The Spanish magazine itself has a section about paper submission guidelines in its webpage <http://www.revistaecosistemas.net/index.php/ecosistemas/about/submissions#authorGuidelines>, so these must be the rules to follow.

#### 3.1. Classification of translation problems

Hurtado Albir (2001:288) proposes four different categories of translation problems: pragmatic, extra-linguistic, linguistic and instrumental problems. Each of these problems is detected, classified and analyzed according to the intra- and extratextual factors both of the source text and the new communicative framework. From the four categories, the first three categories are the most important ones for this analysis, since more examples of them can be found. To find a solution to them, it is essential to detect—and classify them correctly—and then, translators should take into account both the Spanish conventions and the ones made by the brief, and if any ambiguity appears, they should contact with the magazine to solve it.

3.1.1. **Pragmatic problems:** They are problems related to the speech acts in the source text, the author's intention, presuppositions and implicatures.

a) Intention: The intention that the author may want to transmit should be the same in the target text. As has been previously said, the intention of the text is to raise awareness. A perfect way to do it is by short and clear sentences, such as “*cities are places*” (4) and “*we need a science of urbanization*” (7), and the repetition of the same structure, as in, for example, “*population growth in cities, ecology within cities, migration to cities, the economy of cities, climate within cities*” (4).

**Solutions:** In order to maintain the authors' purpose regarding rhetorical resources and style, what is really needed is a literal translation—"las ciudades son lugares", "necesitamos una ciencia del urbanismo" and "el crecimiento de la población en las ciudades, la ecología en las ciudades, la migración a las ciudades, la economía de las ciudades, el clima en las ciudades".

3.1.2. **Extra-linguistic problems:** They are problems that refer to thematic, cultural or encyclopaedic issues.

a) Connotation: The information that appears in the text does not only include denotative meanings, but also connotative ones. Consequently, these connotations are only useful when the reader knows certain social or cultural phenomena. A clear example is the word "*panoply*" (4) which has been explained in the documentation section.

b) Specific lexicon: This aspect is particularly important in translation because if the translator does not know the exact meaning of a word, there could be misunderstandings. This could be the case of "*Rio+20*" (3) and "*gradients*" (9) previously explained. Other examples are "*land use transition*" (9) and "*urbanization science*" (7).

**Solutions:** A research has to be made to fill the translator's lack of knowledge. "*Land use transition*" refers to "any change in land use systems from one state to another one — e.g., from a system dominated by annual crops for local consumption to a system with large tree plantations in response to market demand or new institutions" (Stanford University: 2013). It has been translated as "cambio en el uso de la tierra". A greater difficulty appears with the translation of "*urbanization science*". Should it be translated as "ciencia de la urbanización" or "ciencia del urbanismo"? Since it refers to the concentration and distribution of inhabitants within cities, the second option has

been chosen, although there are some instances in which the word “urbanización” has to be used when the text refers to the residential area or the process of urbanization, which is some kind of collocation in Spanish.

3.1.3. **Linguistic problems:** They are problems related to the differences between the English and the Spanish conventions on how different features should be written such as the non-sourced quotations and the orthotypographic features.

a) Non-sourced quotations: A greater attention to the constructions has to be paid in order to refer to the reference from which the information is taken, to avoid misunderstandings. In the text, a quotation is found which uses italics instead of quotation marks:

“the recent Rio + 20 conference recognized *the need for a holistic approach to urban development and human settlements* and called for *an integrated approach to planning and building sustainable cities and urban settlements*”.

**Solutions:** After some research, this quotation was found in a document written by the General Assembly of the United Nations, but the translator does not have to translate this since there is an official Spanish version of the document. Therefore, what has to be done is to include the official Spanish version:

“En la reciente conferencia Rio + 20, la Asamblea General de las Naciones Unidas (2012) admitió que tenemos ‘la necesidad de aplicar un enfoque holístico del desarrollo urbano y los asentamientos humanos’ y exigió ‘un enfoque integrado de la planificación y construcción de ciudades y asentamientos urbanos sostenibles’.

b) Orthotypographic conventions: There are many differences between both languages at the level of orthotypography. In the text, four of them can be found, which have different solutions. In addition, it cannot be forgotten that it is necessary to adapt everything, not only to the Spanish language, but also to the Spanish magazine’s conventions. To solve all these problems it is necessary to look for information in both the dictionary of Real Academia Española and the in-house style guide. The examples found are:

1. Whereas the capital letter is used in all the lexical words in English, this is not the case in the Spanish language. This can be seen in: ‘It’s Time for an Urbanization Science’.

**Solution:** The magazine *Ecosistemas* says that the title should appear in lower case, so it should be written as required— ‘Llegó la hora para la ciencia del urbanismo’.

2. Whereas there are footnotes in the English magazine, there is a reference list in the Spanish magazine, which carries certain conventions.

**Solution:** As it is a new communicative framework, everything has to be adapted to it eliminating the superscript in the translated text.

3. Punctuation for numbers is also different in both languages.

**Solution:** According to the *Dictionary de la Real Academia Española* and the brief, they require that the numbers from ten thousands onwards should be written separately every three positions by a space. Therefore, the number “29,000” that appears in the text should be written “29 000” in the translation.

4. There is also a difference in the quotation marks. In the English text, the quoted material appears in italics, whereas double quotation marks “...” are used by the Spanish magazine.

3.1.4. **Instrumental problems:** They are problems derived from the difficulty of documentation because it requires much research or the use of computer tools, which can be sometimes difficult for the translators.

a) Research: both the footnotes and the authors’ notes need further research in order to adjust them to the Spanish magazine.



In the case of the footnotes—the reference list in the Spanish version—, they should be written according to the magazine’s style-guide. To do that, the translator should search all the information that they could need—such as the name of all the authors—in order to supply all the requirements because the *Ecosistemas* magazine does not use the formula “et al.”.

In the case of the notes about the authors, the translator has to be aware of the convention that says that proper names should not be translated.

#### 4. Translation procedures and strategies

There are three different methods of translation: the literal translation, the paraphrase and the oblique translation. The latter is the most frequently used because it is the result of applying a gradual series of methods and procedures (Vázquez-Ayora, 1977). This kind of translation departs from the literal translation due to some strategies that help to make a more fluid translation. Different scholars have written about the strategies and have made their own classification, such as the ones by Vinay and Darbelnet (1958), Delisle (1993), Newmark (1988), Vázquez-Ayora (1977) or Hurtado (2001). The description of the strategies used is based on the classification established by Vazquez-Ayora (1977). Although there are many strategies, only the most frequently applied are mentioned in this dissertation. There are many examples of each strategy, but only some of them are mentions here with the purpose of illustration.

- **Transposition:** It means a change in the grammatical category. This strategy can be required by the target language but also depends on the translator. For example: representative → en representación.

| Source Text                        | Translation                     | Type of Transposition       |
|------------------------------------|---------------------------------|-----------------------------|
| <u>an</u> Urbanization Science (1) | <u>la</u> ciencia del urbanismo | Indefinite/Definite Article |
| and (5)                            | pero                            | Other Particles             |
| North American (6)                 | de Norteamérica                 | Adjective/Noun              |
| critically (8)                     | de forma crítica                | Adverb/Noun+Adjective       |
| better understanding (9)           | entender mejor                  | Noun/Verb                   |

- **Modulation:** It means a change in the conceptual basis of a proposition or a modified point of view. For example: God bless you → Salud.

| Source Text                                    | Translation   | Notes                     |
|--|---|---------------------------|
| Compelling as this maybe [...] (4)             | Aunque esto pueda ser la solución que necesitamos [...] |                           |
| [...] for reaching places [...] (6)            | [...] a la hora de trasladarse [...]                    | It is also transposition. |
| What might urbanization science look like? (7) | ¿Qué entendemos por ciencia del urbanismo?              |                           |

- **Equivalence:** It is an extreme case of modulation. It is used with idioms and proverbs. For example: out of sight, out of mind → ojos que no ven, corazón que no siente.

| Source Text                                    | Translation                                   |
|--|---|
| [...] it leaves half of the equation [...] (4) | [...] esto solo es la punta del iceberg [...] |
| At minimum, [...] (7)                          | En esencia, [...]                             |

- **Amplification:** It occurs when more words are used to express the same idea in the target language.

| Source Text                             | Translation  |
|---|--|
| [...] are unlikely to deliver [...] (4) | [...] existe la posibilidad de que no suministren[...] |
| [...] economies [...] (12)              | [...] actividad económica [...]                        |

- **Omission:** It is the suppression of some elements of the phrase which are unnecessary.

| Source Text                                    | Translation                  | Notes                     |
|--|------------------------------|---------------------------|
| [...] as a way to solve [...] (3)              | [...] como solución [...]    |                           |
| [...] a good, hard and inspired look [...] (7) | [...] examinar a fondo [...] | It is also transposition. |

## 5. Adaptation to the Brief

The issue of adapting the source text to the new communicative framework has been dealt in the sections related to the textual analysis, the documentation and the problems and their solutions. This is an important part of the translation process since the translator should follow the conventions established by the magazine. Apart from adapting the text to the Spanish conventions established by the Real Academia Española, the Spanish magazine has its own rules on publication, as has been previously said in Section 3. These are some of the required modifications:

- **Title:** It should be written in lower case.
- **Authors and Summary:** The authors should be written with a superscript which indicates their footnotes. The summary should contain a list of keywords in alphabetical order.
- **Body of the text:** It should be written in 10 points Arial font with 1.5 spacing with a blank line between paragraphs. In this part of the article, they explain the orthotypographic criteria explained before. Footnotes are not allowed.
- **Quotations:** In the text, references to other works will be quoted with the surname of the authors and the year of publication written in blue and separated by a comma. If a reference has more than two authors, they can be substituted by “et al.” written without italics.
- **References:** The list of references should appear at the end of the article. Here, the footnotes of the source text should be adapted to the Spanish references.
- **Information about the authors:** Since the space is limited in the Spanish magazine, the information about the author should be adapted by writing only their main affiliation.

## 6. Revision of the Translated Text

According to Mossop (2007: 124), “revision parameters are the things a reviser checks for – the types of error”. Consequently, this stage of the translation process is essential since there are many things which need to be revised and re-translated again. There are several classifications such as those established by Gouadec (2007) or Mossop (2007). I follow Mossop’s categories, in which ‘errors’ are classified into four different groups: Problems of transfer, content, language and style, and of physical presentation. As a way of example of the revision that I carried out, only a few instances from each of these categories are presented here:

- Problems of transfer: They are related to the accuracy and the completeness of the translation. Examples from the text:

| Source Text       | First Translation                | Final Translation         |
|-------------------|----------------------------------|---------------------------|
| “extensive” (4)   | “ <del>extensiva</del> ”         | “amplia”                  |
| “scholarship” (4) | “ <del>escolaridad</del> ”       | “investigación académica” |
| “smorgasbord” (5) | “ <del>variada selección</del> ” | “gran profusión”          |

- Problems of content: They refer to whether the ideas of the text make sense or not and to factual errors. In this translation, I did not find any ‘errors’ of this category.
- Problems of language and style: They refer to the vocabulary, grammar, spelling and orthography.

| Source Text                | First Translation                 | Final Translation     |
|----------------------------|-----------------------------------|-----------------------|
| “and enticing: Acting” (3) | “y atrayente: <del>Actuar</del> ” | “y atrayente: actuar” |
| “29,000” (5)               | “29.000”                          | “29 000”              |
| “catalysts for” (12)       | “catalizadores <del>para</del> ”  | “catalizadores de”    |

- Problems of physical presentation: It deals with the layout, typography and organization. These problems were not present in this translation.

Once this stage is completed, the translator should reflect upon what kind of ‘errors’ are more frequent in their translations to learn about them and to solve them faster in future. In my case, I have made more mistakes related to language and style because additional efforts were required. These kinds of ‘errors’ has to do with prepositions, punctuation marks, idioms, smoothness of the text and tailoring to the addressee, so there are many different aspects in which the translator can fail. This translation has served me to know more about my own mistakes and to speed up my translation process.

## 7. Translation

### (1) It's Time for an Urbanization Science

*by William Solecki, Karen C. Seto and Peter J.  
Marcotullio*

(2) Today, urban areas generate more than 90% of the global economy, are home to more than 50% of the world population, consume more than 65% of the world's energy; and emit 70% of global greenhouse gas emissions.<sup>1</sup> The science and policy communities increasingly recognize that cities, urban areas, and the underlying urbanization process are at the center of global climate change and sustainability challenges. Policymakers need facts, empirical evidence, and theories on how to plan and manage cities and urbanization during the contemporary era of rapid change and environmental uncertainty.

(3) Scholars spanning from the humanities to social and physical sciences have engaged in the study of cities over the past century and have generated numerous discoveries about urban places and processes that drive their creation and development. While some research has concluded that cities are sources of

### Llegó la hora de la ciencia del urbanismo

William Solecki<sup>1</sup>, Karen C. Seto<sup>2</sup> y Peter J.  
Marcotullio<sup>3</sup>

Hoy en día, las áreas urbanas generan más del 90% de la economía global, albergan más del 50% de la población mundial, consumen más del 65% de la energía mundial y emiten el 70% de las emisiones de gases de efecto invernadero (IEA 2008, UNFPA 2007, United Nations 2011). Cada vez más, las comunidades científicas y políticas reconocen que las ciudades, las áreas urbanas y el proceso subyacente de urbanización se sitúan en el centro del cambio climático y de los retos de sostenibilidad. Los políticos necesitan hechos, evidencias empíricas y teorías sobre como planificar y gestionar las ciudades y el urbanismo durante esta época actual de cambios rápidos e incertidumbre ambiental.

Los investigadores, pertenecientes tanto a las ciencias humanas como a las sociales y físicas, han participado en el estudio de las ciudades a lo largo del último siglo y han generado numerosos descubrimientos sobre los núcleos urbanos y los procesos que impulsan su creación y desarrollo. Mientras algunas investigaciones llegan a la conclusión

environmental degradation, there is also evidence that cities and the lifestyles they engender can be potential solutions to current and future environmental and sustainability challenges. As a sign of confidence in our understanding of cities, the recent Rio + 20 conference recognized *the need for a holistic approach to urban development and human settlements* and called for *an integrated approach to planning and building sustainable cities and urban settlements* to create livable places as a way to solve our local, regional, and even global environmental problems. The idea is simple and enticing: Acting locally within cities can solve our global environmental problems.

de que las ciudades son la fuente de la degradación ambiental, también hay evidencias de que las ciudades y los estilos de vida que los ciudadanos generan pueden facilitar soluciones potenciales para los retos medioambientales y sostenibles, tanto actuales como futuros. Como muestra de apoyo a nuestro entendimiento de las ciudades, la Asamblea General de las Naciones Unidas (2012) admitió en la reciente conferencia *Rio + 20* que, para crear lugares habitables como solución no solo a nuestros problemas locales y regionales, sino también a los problemas ambientales a nivel mundial, tenemos “la necesidad de aplicar un enfoque holístico del desarrollo urbano y los asentamientos humanos”, y exigió “un enfoque integrado de la planificación y construcción de ciudades y asentamientos urbanos sostenibles”. La idea es sencilla y atractiva: actuar a nivel local dentro de las ciudades puede solucionar los problemas ambientales mundiales.

(4) Compelling as this may be, it leaves out half of the equation. Scholarship on cities is extensive,<sup>2</sup> but our knowledge of urbanization is fragmented. Cities are places. Urbanization is a process, one of simultaneous transformation of places, populations, economies, and the built environment that creates an urban society. Despite a panoply of researchers studying

Aunque esto pueda ser la solución que necesitamos, esto solo es la punta del iceberg. La investigación académica sobre las ciudades es amplia, (p. ej. Montgomery et al. 2003), pero nuestro conocimiento sobre el urbanismo está fragmentado. Las ciudades son lugares. La urbanización es un proceso de transformación simultánea de lugares, poblaciones, economías y entornos



cities, research on urbanization has not focused on the process and its intersection with other environmental systems. Consequently, contemporary urban studies are unlikely to deliver the information and knowledge required to help urban areas become the meaningful catalysts for sustainability solutions. Why is this the case? Part of the problem is that each discipline approaches the city and uses its own analytical lenses and tools to examine the processes of interest to that discipline: population growth in cities, ecology within cities, migration to cities, the economy of cities, climate within cities.

construidos que crea la sociedad urbana. A pesar de la panoplia de investigadores que estudian las ciudades, la investigación sobre el urbanismo no se ha centrado en el proceso y en su intersección con otros sistemas medioambientales. Por lo tanto, existe la posibilidad de que los estudios urbanos contemporáneos no suministren la información y el conocimiento necesarios para que las áreas urbanas puedan convertirse en auténticos catalizadores de las soluciones de sostenibilidad. ¿Por qué es esto así? Parte del problema es que cada disciplina estudia la ciudad desde una perspectiva y unas herramientas analíticas propias para examinar los procesos que son de interés dentro de su disciplina, ya sea el crecimiento de la población en las ciudades, la ecología en las ciudades, la migración a las ciudades, la economía de las ciudades o el clima en las ciudades.

(5) As a result, we have a smorgasbord of information and data about cities as places and lack a coherent understanding of the underlying urbanization processes that create urban places and interaction of these processes with other systems. Yet it is exactly this process that is currently unfolding at a scale and rate that has never been matched in history. Urban areas will expand by more than 29,000 soccer fields every day for the next 18

Como resultado, nosotros tenemos una gran profusión de información y datos sobre las ciudades como lugares pero carecemos de un entendimiento coherente sobre los procesos urbanísticos de creación de núcleos urbanos y sobre la interacción de estos procesos con otros sistemas. Pero es precisamente este proceso el que se está desarrollando en la actualidad poco a poco, a una escala y ritmo desconocidos hasta ahora. Las zonas urbanas crecerán más de lo equivalente a 29 000

years and the world is adding 1 billion more urban dwellers every 13 years, a rate twice as fast as just 30 years ago.<sup>3</sup>

campos de fútbol al día durante los próximos 18 años y el mundo está añadiendo mil millones más de residentes urbanos cada 13 años, un ritmo dos veces más rápido que el de hace 30 años (Seto et al. 2011).

(6) This lack of coherent understanding will result in sustainability policies—be it climate, carbon, equity—that are merely stop-gaps at best, and mistakes at worst. Contemporary solutions do not reach to underlying urbanization processes and contexts, but rather continue to address symptoms of problems. If we continue with this piecemeal approach, we will not define meaningful global sustainability solutions. For example, creating more bike lanes in North American cities is a great idea; however, its impact meeting the global sustainability challenge may be offset by many of these same cities continuing to spread outward, becoming more automobile dependent and less useful for reaching places easily by bicycle.

Esta falta de entendimiento coherente permitirá la creación de políticas de sostenibilidad que son simplemente algo provisional en el mejor de los casos y errores en el peor escenario, ya sean el clima, el carbono o la equidad. Las soluciones actuales no abordan los procesos de urbanización y los contextos, sino que continúan tratando los síntomas de nuestros problemas. Si continuamos con este enfoque parcial, no podremos identificar las soluciones necesarias de sostenibilidad global. Por ejemplo, la creación de más carriles bici en ciudades de Norteamérica es una idea fantástica. Sin embargo, su repercusión para cubrir los retos globales de sostenibilidad podría verse contrarrestada si muchas de estas ciudades continúan expandiéndose, cada vez más dependientes de los coches y menos asequibles a la hora de trasladarse fácilmente en bicicleta.

(7) In order to address this lacuna we must take a good, hard, and inspired look at what we are missing. We need a science of urbanization. This science would focus on the fundamental laws of

Para corregir esta deficiencia debemos examinar a fondo lo que nos hace falta. Necesitamos la ciencia del urbanismo. Esta ciencia se centraría en las leyes fundamentales del proceso de urbanización:

the urbanization process: its origins, development, organization, emergent properties, and connections to other social and biophysical processes. What might urbanization science look like? At minimum, it would address three fundamental aspects of urbanization that to date have been only partially answered. First, there is no consensus on the basic components of urbanization. What is missing is a framework that focuses on urbanization as an object of study both within one city and more importantly across cohorts and populations of cities. Generally, axiomatic conditions on the relationship between the population share in urban centers and income generation, or the space for time substitution models associating urban land use and ecosystem service degradation, also have been undertheorized. These statements taken together suggest that we need to explore what makes up the most fundamental aspects of urbanization, across space, place, time, and cultures. In order to take a proactive approach to urbanization and the complex set of socioecological systems interactions within and across urban areas, we need a much better understanding of all system components.

su origen, desarrollo, organización, propiedades emergentes y su relación con otros procesos sociales y biofísicos.

¿Qué entendemos por ciencia del urbanismo? En esencia, trataría tres aspectos fundamentales de la urbanización que hasta ahora solo han sido respondidos parcialmente. Primero, no hay un consenso sobre los componentes básicos urbanos. Lo que hace falta es un marco investigador que se centre en el urbanismo como objeto de estudio tanto de una ciudad concreta como, aún más importante, de los distintos grupos sociables y habitantes existentes entre ciudades. En general, se ha estudiado poco sobre las condiciones axiomáticas en la relación entre el volumen de la población en las zonas urbanas y la generación de ingresos, o entre el espacio para los modelos de sustitución reversibles en el tiempo que asocian el uso del suelo urbano y la degradación de los sistemas de los ecosistemas. Todas estas observaciones en su conjunto sugieren que necesitamos explorar lo que constituyen los aspectos más importantes del urbanismo a través del espacio, el lugar, el tiempo y las diferentes culturas. Necesitamos un mejor entendimiento de todos los componentes del sistema para adoptar un planteamiento *proactivo* respecto a la urbanización y a los complejos conjuntos de interacciones de los sistemas socioecológicos, tanto dentro de las

zonas urbanas como entre ellas.

(8) Second, we need to explore and critically examine the empirical evidence that presents the urbanization system (meaning the set of components and process of changing urban centers) in and of itself as unique among systems (at any scale) and ask how the associated elements and processes influence other systems. Can we identify a theory of urbanization with fundamental and unique components that can withstand scientific scrutiny and produce valuable universal laws and theories? A more critical review of the evidence on urbanization as a process and not on cities as places could lead to systemic solutions that address the whole rather than separate components.

Segundo, necesitamos explorar y estudiar de forma crítica las evidencias empíricas que presentan al sistema urbanístico (entendiendo como tal el conjunto de elementos y procesos de los centros urbanos en proceso de cambio) en sí mismo como único entre los sistemas (a cualquier escala) y preguntarnos cómo los procesos y elementos asociados influyen sobre otros sistemas. ¿Podemos identificar una teoría urbanizadora con componentes fundamentales y únicos que puedan resistir el escrutinio científico y producir leyes y teorías universales y útiles?

Una revisión más crítica de la urbanización como proceso y no de ciudades como lugares podría conducir a soluciones sistémicas que aborden todo el conjunto, más que los elementos de forma separada.

(9) Finally, can we then find relationships between urbanization and other aspects of the Earth System? We argue that a science is needed to understand how urbanization unfolds so that we can develop generalities to larger scales and with that understand how this process interacts with local and global environments. For example, while there have been studies of how biodiversity changes in urban to rural gradients, there

Finalmente, ¿podemos entonces encontrar relación entre el urbanismo y otros aspectos de nuestro planeta? Creemos que se necesita una ciencia para entender cómo el urbanismo se desarrolla poco a poco y así poder elaborar aspectos comunes aplicables a mayor escala y entender cómo este proceso interactúa con los entornos locales y globales. Por ejemplo, aunque ha habido estudios sobre el contraste entre la biodiversidad urbana y rural, no ha existido un estudio que investigue de qué

has not been a study that examines whether and how urbanization has affected, for example, the latitudinal gradient in biodiversity or any of the ecogeographic rules of biodiversity. Is global urbanization resulting in a typology of cities that can be useful in understanding impacts and responses to climate change? How does urbanization affect land use transitions? How does urbanization affect poverty across urban–rural gradients? To answer these questions we need a firm grasp on what urbanization is and how it interacts with other systems. The answers to these questions will lead to a better understanding of how, when, where, and at what scale urbanization connects to laws and principles in other sciences.

manera el urbanismo ha afectado a ello, como el contraste latitudinal de la biodiversidad o de cualquier otra norma eco geográfica de la biodiversidad. ¿Está el urbanismo global dando lugar a una tipología de ciudades que puede ser útil a la hora de entender los efectos y las respuestas al cambio climático? ¿Cómo afecta el urbanismo al cambio en el uso de la tierra? ¿y a la pobreza en los gradientes urbano a rural? Para contestar estas preguntas necesitamos un gran conocimiento sólido de qué es el urbanismo y como interactúa con otros sistemas. Las respuestas a estas preguntas nos llevarán a entender mejor el cómo, cuándo, dónde y a qué escala el urbanismo está vinculado a las leyes y los principios de otras ciencias.

(10) The science emerging from these fundamental questions can contribute to the goals of sustainability practice. If we better understand the local, regional, and global urbanization processes, these insights could be brought to the city (re)building process now underway via changes in policy shifts and market incentives. The importance of a scientific understanding of urbanization is underscored by recent weather events, such as Hurricane Sandy, which hit coastal urban areas in New York and New

La ciencia que surge de estas cuestiones fundamentales puede contribuir a los objetivos de la práctica sostenible. Si entendemos mejor los procesos de urbanización locales, regionales y globales, estos conocimientos podrían reconducir el actual proceso de (re)construcción de las ciudades por medio de cambios en las políticas y en los incentivos del mercado. La importancia de un planteamiento científico del urbanismo se ha visto reforzada por fenómenos meteorológicos recientes, como el huracán Sandy, que golpeó las zonas urbanas

Jersey in October 2012. The storm's impacts, which are predicted to be among the most costly in U.S. history, highlight the great need for better understanding of urbanization and its relationship to larger processes, such as climate change, just at a time when greater attention is being paid to these processes.

The result of not developing a science on such fundamentals is to continue scholarly fragmentation and lack of scientific consensus on which to build evidence-based policies.

### **(11) Why Now?**

There are several emerging opportunities that steel our resolve for such an effort to fully specify urbanization science, beginning with the increasing amount of available data that can help us address previous modeling barriers. There are also a growing number of research communities calling for such a science, including long-term ecological researchers, the urban modeling community, the remote sensing community, land change scientists, and the urbanization and global environmental change research community, as well as those who are attempting to apply physical laws to

costeras de Nueva York y Nueva Jersey en octubre de 2012.

Las consecuencias de la tormenta, que se espera que sean de las más costosas en la historia de los EE.UU., recalcan la gran necesidad de una mejor comprensión del urbanismo y su relación con procesos más amplios, como el cambio climático, precisamente en un momento en el que se presta una mayor atención a dichos procesos. El resultado de no desarrollar una ciencia sobre dichos fundamentos es continuar con la fragmentación académica y con la falta de un consenso científico sobre el que desarrollar políticas basadas en evidencias.

### **¿Por qué ahora?**

Hay varias oportunidades emergentes que apoyan nuestra determinación en dicho intento de concretar por completo la ciencia del urbanismo, empezando por la creciente cantidad de datos disponibles que pueden ayudarnos a tratar con obstáculos anteriormente planteados.

Hay un creciente número de comunidades científicas que también exigen dicha ciencia, incluyendo investigadores ecológicos consolidados, la comunidad urbana expuesta, la comunidad de tele observación, los científicos relacionados con el cambio en el uso del suelo y la comunidad científica del cambio ambiental mundial y del urbanismo, al igual que aquellos que están intentando

cities.<sup>4</sup> These scholars have the expertise to develop such a science. Finally, a greater sophistication in analysis, availability of large-scale data, and hardware can be brought to bear on this analysis.

aplicar leyes físicas en las ciudades (p. ej. Batty 2008, Bettencourt y West 2010, Grimm et al. 2008, Seto et al. 2012).

Estos investigadores tienen la capacidad necesaria para desarrollar dicha ciencia. Finalmente, a este análisis podrían añadirse una mayor sofisticación, la disponibilidad de datos a gran escala y herramientas informáticas.

(12) More important than the data, expertise, and technologies is the urgent need for the development of this science. We endorse the sentiment that came out of the Rio + 20 meeting that *cities* can be effective catalysts for sustainable development. They are, however, necessary but not sufficient actors in sustainability efforts. Urbanization unfolds on multiple scales and needs to be addressed at these scales. While there are all too few examples of regional and national urban programs that address urbanization, there is nothing at the global scale. A research effort on urbanization, similar to that of climate change science, is necessary to support policy development at these larger scales.<sup>5</sup> Certainly, policymakers at multiple levels of governance can positively influence the externalities associated with urbanization, but only if they have the scientific evidence and

Más importante aún que los datos, la experiencia y la tecnología es la urgente necesidad de desarrollar esta ciencia. Nosotros apoyamos el sentimiento que surgió en la conferencia Rio+20 de que las ciudades pueden ser catalizadores eficaces para el desarrollo sostenible. Aunque las ciudades son necesarias, no son suficientes en los esfuerzos de sostenibilidad.

El urbanismo se desarrolla a distintas escalas y necesita ser tratado a estas escalas. Mientras hay muy pocos ejemplos de programas urbanos a nivel regional y nacional que aborden el tema del urbanismo, no hay nada a escala global. Para apoyar el desarrollo de políticas a estas escalas es necesario un esfuerzo de investigación sobre el urbanismo similar al que se ha hecho en la ciencia sobre el cambio climático (Rosenzweig 2011). Definitivamente, los políticos, en sus niveles de responsabilidad, pueden influir positivamente sobre los factores asociados al urbanismo, pero solo si tienen las pruebas y

understanding of how the system works. Given the growing importance of urbanization and the concentration of populations and economies in cities, urbanization is now of global interest to researchers and policies, which both should be directed toward this goal. We believe that the moment has arrived for the development of an urbanization science that will provide the basis for and stimulation of local, national, and international laws, regulations and agreements.

el conocimiento científico sobre cómo funciona este sistema. Debido a la creciente importancia del urbanismo y la concentración de población y actividad económica en las ciudades, el urbanismo es ahora de interés mundial para los investigadores y los principios políticos, que deberían orientarse hacia este objetivo. Nosotros creemos que ha llegado el momento de desarrollar una ciencia que servirá de base y estímulo para la creación de leyes, reglamentos y acuerdos locales, nacionales e internacionales.

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2. See, for example, M. R. Montgomery, R. Stren, et al., *Cities Transformed, Demographic Change in its Implications in the Developing World* (Washington, DC: National Academies Press, 2003).

3. K. Seto, M. Fragkias, et al., *A Meta-Analysis of Global Urban Land Expansion*, *PloS One* 6, no. 8 (2011).

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## 8. Conclusions

The aim of this dissertation is to make an incursion in the field of translation, not only to put the translation process into practice with all its different stages, but also to cope with and to find solutions to problems which can appear in a real translation brief.

Regarding the translation process proposed by Nord (2012), the analysis of the intra- and extratextual factors has proved very useful, since the translator needs to understand the text in full before starting to translate it.

Furthermore, the source text, written by William Solecki, Karen C. Seto and Peter J. Marcotullio, deals with an issue which is interesting from the point of view of the reader and is also appealing for the translator because of the different challenges it can pose, so its translation also contributes to improve the skills of the translator.

Regarding the analysis about the translation problems and their classification in section 3, the linguistic problems are the most frequent in this translation. Within this category, it is important to stress that the orthotypographic conventions are those that required greater effort and research.

Regarding the translation procedures and strategies, the transposition, where there was a category change of the words due to grammatical aspects, is by far the most widely used. Omission is also a very useful strategy since there are some instances in which the information conveyed could be expressed in fewer words.

Finally, this dissertation has been a remarkable experience in translation and has allowed me to analyse a source text written in English (American English), so I learnt specific characteristics of this language that have enriched my knowledge about this variety, comparing and contrasting it with my mother tongue, the Spanish language.

## Appendices

### Appendix A – Source Text

#### It's Time for an Urbanization Science

*by William Solecki, Karen C. Seto and Peter J. Marcotullio*

Today, urban areas generate more than 90% of the global economy, are home to more than 50% of the world population, consume more than 65% of the world's energy; and emit 70% of global greenhouse gas emissions.<sup>1</sup> The science and policy communities increasingly recognize that cities, urban areas, and the underlying urbanization process are at the center of global climate change and sustainability challenges. Policymakers need facts, empirical evidence, and theories on how to plan and manage cities and urbanization during the contemporary era of rapid change and environmental uncertainty.

Scholars spanning from the humanities to social and physical sciences have engaged in the study of cities over the past century and have generated numerous discoveries about urban places and processes that drive their creation and development. While some research has concluded that cities are sources of environmental degradation, there is also evidence that cities and the lifestyles they engender can be potential solutions to current and future environmental and sustainability challenges. As a sign of confidence in our understanding of cities, the recent Rio + 20 conference recognized *the need for a holistic approach to urban development and human settlements* and called for *an integrated approach to planning and building sustainable cities and urban settlements* to create livable places as a way to solve our local, regional, and even global environmental problems. The idea is simple and enticing: Acting locally within cities can solve our global environmental problems.

Compelling as this may be, it leaves out half of the equation. Scholarship on cities is extensive,<sup>2</sup> but our knowledge of urbanization is fragmented. Cities are places. Urbanization is a process, one of simultaneous transformation of places, populations, economies, and the built environment that creates an urban society. Despite a panoply of researchers studying cities, research on urbanization has not focused on the process and its intersection with other environmental systems. Consequently, contemporary urban studies are unlikely to deliver the information and knowledge required to help urban areas become the meaningful catalysts for sustainability solutions. Why is this the case? Part of the problem is that each discipline approaches the city and uses its own analytical lenses and tools to examine the processes of interest to that discipline: population growth in cities, ecology within cities, migration to cities, the economy of cities, climate within cities.

As a result, we have a smorgasbord of information and data about cities as places and lack a coherent understanding of the underlying urbanization processes that create urban places and interaction of these processes with other systems. Yet it is exactly this process that is currently unfolding at a scale and rate that has never been matched in history. Urban areas will expand by more than 29,000 soccer fields every day for the next 18 years and the world is adding 1 billion more urban dwellers every 13 years, a

rate twice as fast as just 30 years ago.<sup>3</sup>

This lack of coherent understanding will result in sustainability policies—be it climate, carbon, equity—that are merely stop-gaps at best, and mistakes at worst. Contemporary solutions do not reach to underlying urbanization processes and contexts, but rather continue to address symptoms of problems. If we continue with this piecemeal approach, we will not define meaningful global sustainability solutions. For example, creating more bike lanes in North American cities is a great idea; however, its impact meeting the global sustainability challenge may be offset by many of these same cities continuing to spread outward, becoming more automobile dependent and less useful for reaching places easily by bicycle.

In order to address this lacuna we must take a good, hard, and inspired look at what we are missing. We need a science of urbanization. This science would focus on the fundamental laws of the urbanization process: its origins, development, organization, emergent properties, and connections to other social and biophysical processes. What might urbanization science look like? At minimum, it would address three fundamental aspects of urbanization that to date have been only partially answered. First, there is no consensus on the basic components of urbanization. What is missing is a framework that focuses on urbanization as an object of study both within one city and more importantly across cohorts and populations of cities. Generally, axiomatic conditions on the relationship between the population share in urban centers and income generation, or the space for time substitution models associating urban land use and ecosystem service degradation, also have been undertheorized. These statements taken together suggest that we need to explore what makes up the most fundamental aspects of urbanization, across space, place, time, and cultures. In order to take a proactive approach to urbanization and the complex set of socioecological systems interactions within and across urban areas, we need a much better understanding of all system components.

Second, we need to explore and critically examine the empirical evidence that presents the urbanization system (meaning the set of components and process of changing urban centers) in and of itself as unique among systems (at any scale) and ask how the associated elements and processes influence other systems. Can we identify a theory of urbanization with fundamental and unique components that can withstand scientific scrutiny and produce valuable universal laws and theories? A more critical review of the evidence on urbanization as a process and not on cities as places could lead to systemic solutions that address the whole rather than separate components.

Finally, can we then find relationships between urbanization and other aspects of the Earth System? We argue that a science is needed to understand how urbanization unfolds so that we can develop generalities to larger scales and with that understand how this process interacts with local and global environments. For example, while there have been studies of how biodiversity changes in urban to rural gradients and statements on the increasing homogeneity of urban biota, there has not been a study that examines whether and how urbanization has affected, for example, the latitudinal gradient in biodiversity or any of the ecogeographic rules of biodiversity. Is global urbanization resulting in a typology of cities that can be useful in understanding impacts and responses to climate change? How does urbanization affect land use transitions? How does urbanization affect poverty across urban–rural gradients? To answer these questions we need a firm grasp on what urbanization is and how it interacts with other

systems. The answers to these questions will lead to a better understanding of how, when, where, and at what scale urbanization connects to laws and principles in other sciences.

The science emerging from these fundamental questions can contribute to the goals of sustainability practice. If we better understand the local, regional, and global urbanization processes, these insights could be brought to the city (re)building process now underway via changes in policy shifts and market incentives. The importance of a scientific understanding of urbanization is underscored by recent weather events, such as Hurricane Sandy, which hit coastal urban areas in New York and New Jersey in October 2012. The storm's impacts, which are predicted to be among the most costly in U.S. history, highlight the great need for better understanding of urbanization and its relationship to larger processes, such as climate change, just at a time when greater attention is being paid to these processes. The result of not developing a science on such fundamentals is to continue scholarly fragmentation and lack of scientific consensus on which to build evidence-based policies.

### **Why Now?**

There are several emerging opportunities that steel our resolve for such an effort to fully specify urbanization science, beginning with the increasing amount of available data that can help us address previous modeling barriers. There are also a growing number of research communities calling for such a science, including long-term ecological researchers, the urban modeling community, the remote sensing community, land change scientists, and the urbanization and global environmental change research community, as well as those who are attempting to apply physical laws to cities.<sup>4</sup> These scholars have the expertise to develop such a science. Finally, a greater sophistication in analysis, availability of large-scale data, and hardware can be brought to bear on this analysis.

More important than the data, expertise, and technologies is the urgent need for the development of this science. We endorse the sentiment that came out of the Rio + 20 meeting that *cities* can be effective catalysts for sustainable development. They are, however, necessary but not sufficient actors in sustainability efforts. Urbanization unfolds on multiple scales and needs to be addressed at these scales. While there are all too few examples of regional and national urban programs that address urbanization, there is nothing at the global scale. A research effort on urbanization, similar to that of climate change science, is necessary to support policy development at these larger scales.<sup>5</sup> Certainly, policymakers at multiple levels of governance can positively influence the externalities associated with urbanization, but only if they have the scientific evidence and understanding of how the system works. Given the growing importance of urbanization and the concentration of populations and economies in cities, urbanization is now of global interest to researchers and policies, which both should be directed toward this goal. We believe that the moment has arrived for the development of an urbanization science that will provide the basis for and stimulation of local, national, and international laws, regulations and agreements.

1. IEA, *World Energy Outlook 2008* (Paris, OECD/IEA, 2008); UNFPA, *State of the World Population: Unleashing the Potential of Urban Growth* (New York, NY: United Nations Population Fund, 2007); and United Nations, *National Accounts Main Aggregates Database* (New York, NY: United Nations, Statistics Division, 2011),

available at <http://unstats.un.org/unsd/snaama> (accessed March 21, 2012).

2. See, for example, M. R. Montgomery, R. Stren, et al., *Cities Transformed, Demographic Change in its Implications in the Developing World* (Washington, DC: National Academies Press, 2003).

3. K. Seto, M. Fragkias, et al., *A Meta-Analysis of Global Urban Land Expansion*, *PloS One* 6, no. 8 (2011).

4. M. Batty, *The Size, Scale, and Shape of Cities*, *Science* 319 (2008): 769–771; L. Bettencourt and G. West, *A Unified Theory of Urban Living*, *Nature* 467 (2010): 912–913; N. Grimm, S. H. Faeth, et al., *Global Change and the Ecology of Cities*, *Science* 319, no. 5864 (2008): 756–760; and K. C. Seto, A. Reenberg, et al., *Urban Land Teleconnections and Sustainability*. *Proceeding of the National Academy of Sciences of the United States of America* 109, no. 18 (2012), available at [www.pnas.org/cgi/doi/10.1073/pnas.1117622109](http://www.pnas.org/cgi/doi/10.1073/pnas.1117622109)

5. C. Rosenzweig, W. D. Solecki, et al., eds., *Climate Change and Cities, First Assessment Report of the Urban Climate Change Research Network* (Cambridge, UK: Cambridge University Press, 2011).

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## Appendix B – Final Version

See Next Page.



# Llegó la hora para la ciencia del urbanismo

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**Solecki, W., Seto, K.C., Marcotullio, P.J. (2013). Llegó la hora para la ciencia del urbanismo.**

Cada vez más, las comunidades científicas y políticas reconocen que las ciudades, las áreas urbanas y el proceso subyacente de urbanización se sitúan en el centro del cambio climático y de los retos de sostenibilidad.

**Palabras Clave:** cambio climatico; ciudades; investigadores; problemas ambientales

**Solecki, W., Seto, K.C., Marcotullio, P.J. (2013). It's time for an urbanization science.**

The science and policy communities increasingly recognize that cities, urban areas, and the underlying urbanization process are at the center of global climate change and sustainability challenges.

**Keywords:** climate change; cities; researchers; environmental problems

Hoy en día, las áreas urbanas generan más del 90% de la economía global, albergan más del 50% de la población mundial, consumen más del 65% de la energía mundial y emiten el 70% de las emisiones de gases de efecto invernadero globales ([IEA 2008](#), [UNFPA 2007](#), [United Nations 2011](#)). Cada vez más, las comunidades científicas y políticas reconocen que las ciudades, las áreas urbanas y el proceso subyacente de urbanización se sitúan en el centro del cambio climático y de los retos de sostenibilidad. Los políticos necesitan hechos, evidencias empíricas y teorías sobre como planificar y gestionar las ciudades y el urbanismo durante esta época actual de cambios rápidos e incertidumbre ambiental.

Los investigadores, pertenecientes tanto a las ciencias humanas como a las sociales y físicas, han participado en el estudio de las ciudades a lo largo del último siglo y han generado numerosos descubrimientos sobre los núcleos urbanos y los procesos que impulsan su creación y desarrollo. Mientras algunas investigaciones llegan a la conclusión de que las ciudades son la fuente de la degradación ambiental, también hay evidencias de que las ciudades y los estilos de vida que los

ciudadanos generan pueden facilitar soluciones potenciales para los retos medioambientales y sostenibles tanto actuales como futuros. Como muestra de apoyo a nuestro entendimiento de las ciudades, la Asamblea General de las [Naciones Unidas](#) admitió en la reciente conferencia *Rio + 20* que para crear lugares habitables como solución no solo a nuestros problemas locales y regionales, sino también a los problemas ambientales a nivel mundial, tenemos “la necesidad de aplicar un enfoque holístico del desarrollo urbano y los asentamientos humanos” y exigió “un enfoque integrado de la planificación y construcción de ciudades y asentamientos urbanos sostenibles” ([2012](#)). La idea es sencilla y atrayente: actuar a nivel local dentro de las ciudades puede solucionar los problemas ambientales mundiales.

Aunque esto pueda ser la solución que necesitamos, esto solo es la punta del iceberg. La investigación académica sobre las ciudades es amplia, (p. ej. [Montgomery et al. 2003](#)), pero nuestro conocimiento sobre el urbanismo está fragmentado. Las ciudades son lugares. La urbanización es un proceso de transformación simultánea de lugares, poblaciones,



economías y entornos contruidos que crea la sociedad urbana. A pesar de la panoplia de investigadores que estudian las ciudades, la investigación sobre el urbanismo no se ha centrado en el proceso y en su intersección con otros sistemas medioambientales. Por lo tanto, existe la posibilidad de que los estudios urbanos contemporáneos no suministren la información y el conocimiento necesarios para que las áreas urbanas puedan convertirse en auténticos catalizadores de las soluciones de sostenibilidad. ¿Por qué es esto así? Parte del problema es que cada disciplina estudia la ciudad desde una perspectiva y unas herramientas analíticas propias para examinar los procesos que son de interés dentro de su disciplina, ya sea el crecimiento de la población en las ciudades, la ecología en las ciudades, la migración a las ciudades, la economía de las ciudades o el clima en las ciudades.

Como resultado, nosotros tenemos una gran profusión de información y datos sobre las ciudades como lugares pero carecemos de un entendimiento coherente sobre los procesos urbanísticos de creación de núcleos urbanos y sobre la interacción de estos procesos con otros sistemas. Pero, es precisamente este proceso el que se está desarrollando en la actualidad poco a poco a una escala y ritmo desconocidos hasta ahora. Las zonas urbanas crecerán más de lo equivalente a 29 000 campos de fútbol al día durante los próximos 18 años y el mundo está añadiendo mil millones más de residentes urbanos cada 13 años, un ritmo dos veces más rápido que el de hace 30 años (Seto et al. 2011).

Esta falta de entendimiento coherente permitirá la creación de políticas de sostenibilidad que son simplemente algo provisional en el mejor de los casos y errores en el peor escenario —ya sean el clima, el carbono, la equidad—. Las soluciones actuales no abordan los procesos de urbanización y los contextos, sino que continúan tratando los síntomas de nuestros problemas. Si continuamos con este enfoque parcial, no podremos identificar las soluciones necesarias de sostenibilidad global. Por ejemplo, la creación de más carriles bici en ciudades de Norteamérica es una idea fantástica. Sin embargo, su repercusión para cubrir los retos globales de sostenibilidad podría verse contrarrestada si muchas de estas ciudades continúan expandiéndose, cada vez más dependientes de los coches y menos asequibles a la hora de trasladarse fácilmente en bicicleta.

Para corregir esta deficiencia debemos examinar a fondo lo que nos hace falta. Necesitamos la ciencia del urbanismo. Esta ciencia se centraría en las leyes fundamentales del proceso de urbanización: su origen, desarrollo, organización, propiedades emergentes y su relación con otros procesos sociales y biofísicos. ¿Qué entendemos por ciencia del urbanismo? En esencia, trataría tres aspectos fundamentales de la urbanización que hasta ahora solo han sido respondidos parcialmente. Primero, no hay un consenso sobre los

componentes básicos urbanos. Lo que hace falta es un marco investigador que se centre en el urbanismo como objeto de estudio tanto de una ciudad concreta como, aún más importante, de los distintos grupos sociables y habitantes existentes entre ciudades. En general, se ha estudiado poco sobre las condiciones axiomáticas sobre la relación entre el volumen de la población en las zonas urbanas y la generación de ingresos, o entre el espacio para los modelos de sustitución reversibles en el tiempo que asocian el uso del suelo urbano y la degradación de los sistemas de los ecosistemas. Todas estas observaciones en su conjunto sugieren que necesitamos explorar lo que constituyen los aspectos más importantes del urbanismo a través del espacio, el lugar, el tiempo y las diferentes culturas. Necesitamos un mejor entendimiento de todos los componentes del sistema para adoptar un planteamiento *proactivo* respecto a la urbanización y a los complejos conjuntos de interacciones de los sistemas socioecológicos tanto dentro de las zonas urbanas como entre ellas.

Segundo, necesitamos explorar y estudiar de forma crítica las evidencias empíricas que presentan al sistema urbanístico (entendiendo como tal el conjunto de elementos y procesos de los centro urbanos en proceso de cambio) en sí mismo como único entre los sistemas (a cualquier escala) y preguntarnos como los procesos y elementos asociados influyen sobre otros sistemas. ¿Podemos identificar una teoría urbanizadora con componentes fundamentales y únicos que puedan resistir el escrutinio científico y producir leyes y teorías universales y útiles? Una revisión más crítica de la urbanización como proceso y no de ciudades como lugares podría conducir a soluciones sistémicas que aborden todo el conjunto más que los elementos de forma separada.

Finalmente, ¿podemos entonces encontrar relación entre el urbanismo y otros aspectos de nuestro planeta? Creemos que se necesita una ciencia para entender como el urbanismo se desarrolla poco a poco y así poder elaborar aspectos comunes aplicables a mayor escala y entender como este proceso interactúa con los entornos locales y globales. Por ejemplo, aunque ha habido estudios sobre el contraste entre la biodiversidad urbana y rural, no ha existido un estudio que investigue de qué manera el urbanismo ha afectado a ello, como por ejemplo, el contraste latitudinal de la biodiversidad o de cualquier otra norma eco geográfica de la biodiversidad. ¿Está el urbanismo global dando lugar a una tipología de ciudades que puede ser útil a la hora de entender los efectos y las respuestas al cambio climático? ¿Cómo afecta el urbanismo al cambio en el uso de la tierra? ¿y a la pobreza en los gradientes urbano a rural? Para contestar estas preguntas necesitamos un gran conocimiento solido de que es el urbanismo y como interactúa con otros sistemas. Las respuestas a estas preguntas nos llevaran a entender mejor el cómo,

cuándo, dónde y a qué escala el urbanismo está vinculado a las leyes y los principios de otras ciencias.

La ciencia que surge de estas cuestiones fundamentales puede contribuir a los objetivos de la práctica sostenible. Si entendemos mejor los procesos de urbanización locales, regionales y globales, estos conocimientos podrían reconducir el actual proceso de (re)construcción de las ciudades por medio de cambios en las políticas y en los incentivos del mercado. La importancia de un planteamiento científico del urbanismo se ha visto reforzada por fenómenos meteorológicos recientes, como el huracán Sandy, que golpeó las zonas urbanas costeras de Nueva York y Nueva Jersey en octubre de 2012. Las consecuencias de la tormenta, que se espera que sean de las más costosas en la historia de los EE.UU., recalcan la gran necesidad de una mejor comprensión del urbanismo y su relación con procesos más amplios como el cambio climático, precisamente en un momento en el que se presta una mayor atención a dichos procesos. El resultado de no desarrollar una ciencia sobre dichos fundamentos es continuar con la fragmentación académica y con la falta de un consenso científico sobre el que desarrollar políticas basadas en evidencias.

### ¿Por qué ahora?

Hay varias oportunidades emergentes que apoyan nuestra determinación en dicho intento de concretar por completo la ciencia del urbanismo, empezando por la creciente cantidad de datos disponibles que pueden ayudarnos a tratar con obstáculos anteriormente planteados. Hay un creciente número de comunidades científicas que también exigen dicha ciencia, incluyendo investigadores ecológicos consolidados, la comunidad urbana expuesta, la comunidad de teleobservación, los científicos relacionados con el cambio en el uso del suelo y la comunidad científica del cambio

ambiental mundial y del urbanismo, al igual que aquellos que están intentando aplicar leyes físicas en las ciudades (p. ej. Batty 2008, Bettencourt y West 2010, Grimm et al. 2008, Seto et al. 2012). Estos investigadores tienen la capacidad necesaria para desarrollar dicha ciencia. Finalmente, a este análisis podrían añadirse una mayor sofisticación, la disponibilidad de datos a gran escala y herramientas informáticas.

Más importante aún que los datos, la experiencia y la tecnología es la urgente necesidad de desarrollar esta ciencia. Nosotros apoyamos el sentimiento que surgió en la conferencia Rio+20 de que las ciudades pueden ser catalizadores eficaces para el desarrollo sostenible. Aunque las ciudades son necesarias, no son suficientes en los esfuerzos de sostenibilidad. El urbanismo se desarrolla a distintas escalas y necesita ser tratado a estas escalas. Mientras hay muy pocos ejemplos de programas urbanos a nivel regional y nacional que aborden el tema del urbanismo, no hay nada a escala global. Para apoyar el desarrollo de políticas a estas escalas es necesario un esfuerzo de investigación sobre el urbanismo similar al que se ha hecho en la ciencia sobre el cambio climático (Rosenzweig 2011). Definitivamente, los políticos en sus niveles de responsabilidad pueden influir positivamente sobre los factores asociados al urbanismo, pero solo si tienen las pruebas y el conocimiento científico sobre cómo funciona este sistema. Debido a la creciente importancia del urbanismo y la concentración de población y actividad económica en las ciudades, el urbanismo es ahora de interés mundial para los investigadores y los principios políticos, que deberían orientarse hacia este objetivo. Nosotros creemos que ha llegado el momento de desarrollar una ciencia que servirá de base y estímulo para la creación de leyes, reglamentos y acuerdos locales, nacionales e internacionales.

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